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GO2-11-112

U.S. Nuclear Regulatory Commission  
ATTN: Document Control Desk  
Washington, D.C. 20555-0001

Subject: **COLUMBIA GENERATING STATION, DOCKET NO. 50-397  
RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION  
LICENSE RENEWAL APPLICATION**

- References:
- 1) Letter, GO2-10-11, dated January 19, 2010, WS Oxenford (Energy Northwest) to NRC, "License Renewal Application"
  - 2) Letter dated May 24, 2011, NRC to DA Swank (Energy Northwest), "Request for Additional Information for the Review of the Columbia Generating Station, License Renewal Application," (ADAMS Accession No. ML11138A323)
  - 3) Letter dated December 7, 2010, SK Gambhir (Energy Northwest) to NRC, "Response to Request for Additional Information License Renewal Application," (GO2-10-173)
  - 4) Letter dated January 20, 2011, SK Gambhir (Energy Northwest) to NRC, "Response to Request for Additional Information License Renewal Application," (GO2-11-017)

Dear Sir or Madam:

By Reference 1, Energy Northwest requested the renewal of the Columbia Generating Station (Columbia) operating license. Via Reference 2, the Nuclear Regulatory Commission (NRC) requested additional information related to the Energy Northwest submittal.

Transmitted herewith in the Attachment is the Energy Northwest response to the Request for Additional Information (RAI) contained in Reference 2. References 3 and 4 contained Amendments 16 and 22 to the Columbia License Renewal Application.

A143  
NRC

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Three pages from these amendments have had editorial changes made to them and are included in Enclosure 1.

Enclosure 1 contains Amendment 37 to the Columbia License Renewal Application. One new and two revised commitments are included in this response.

If you have any questions or require additional information, please contact Abbas Mostala at (509) 377-4197.

I declare under penalty of perjury that the foregoing is true and correct. Executed on the date of this letter.

Respectfully,



DA Swank  
Acting Vice President, Engineering

Attachment: Response to Request for Additional Information

Enclosure: License Renewal Application Amendment 37

cc: NRC Region IV Administrator  
NRC NRR Project Manager  
NRC Senior Resident Inspector/988C  
EFSEC Manager  
RN Sherman – BPA/1399  
WA Horin – Winston & Strawn  
AD Cunanan - NRC NRR (w/a)  
BE Holian - NRC NRR  
RR Cowley – WDOH

# **RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION LICENSE RENEWAL APPLICATION**

Attachment 1

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## **RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION**

“Request for Additional Information for the Review of the Columbia Generating Station,  
License Renewal Application,”  
(ADAMS Accession No. ML11138A323)

### **RAI B.1.4-1**

#### **Background:**

Pursuant to 10 CFR 54.21 (a)(3), a license renewal applicant is required to demonstrate that the effects of aging on structures and components subject to an aging management review are adequately managed so that their intended functions will be maintained consistent with the current licensing basis for the period of extended operation. Section 3.0.1 of NUREG-1800, "Standard Review Plan for Review of License Renewal Applications for Nuclear Power Plants," Revision 2 (SRP-LR), defines an aging management review as the identification of the materials, environments, aging effects, and aging management programs (AMPs) credited for managing the aging effects. In turn, SRP-LR Section A.1.2.3 defines an acceptable AMP as consisting of ten elements. Element 10, "Operating Experience," in part, is described in SRP-LR Section A.1.2.3.10, paragraph 1, as follows:

Consideration of future plant-specific and industry operating experience relating to aging management programs should be discussed. Reviews of operating experience by the applicant in the future may identify areas where aging management programs should be enhanced or new programs developed. An applicant should commit to a *future review of plant-specific and industry operating experience to confirm the effectiveness of its aging management programs or indicate a need to develop new aging management programs* (emphasis added). This information should provide objective evidence to support the conclusion that the effects of aging will be managed adequately so that the structure and component intended function(s) will be maintained during the period of extended operation.

In addition, 10 CFR 54.21 (d) requires the application to contain a final safety analysis report (FSAR) supplement. This supplement must contain a summary description of the programs and activities for managing the effects of aging and the evaluation of time-limited aging analyses for the period of extended operation.

Based on its review of the Columbia Generating Station license renewal application (LRA), the staff determined that Section B.1.4 provides a general description of how the applicant gathered and considered operating experience in preparing its LRA, and Sections B.2.1 through B.2.53 summarize the specific operating experience considered for each AMP.

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### **Issue:**

Although LRA Sections B.1.4 and B.2.1 through B.2.53 describe how the applicant incorporated operating experience into its AMPs, they do not fully describe how the applicant will use future operating experience to ensure that the AMPs will remain effective for managing the aging effects during the period of extended operation. The majority of the program descriptions contain statements indicating that future operating experience will be used to adjust the programs as appropriate; however, the details of this process are not fully described. Also, some program descriptions contain no such statements and, for these AMPs, it is not clear whether the applicant currently has or intends to implement actions to monitor operating experience on an ongoing basis and use it to ensure the continued effectiveness of the AMPs. In addition, the LRA does not state whether new AMPs will be developed, as necessary. Further, none of AMP descriptions provide the staff reasonable assurance that ongoing operating experience reviews will continue to inform AMP updates for license renewal.

### **Request:**

Describe the programmatic activities that will be used to continually identify aging issues, evaluate them, and, as necessary, enhance the AMPs or develop new AMPs for license renewal. In this description, address the following:

- a) Describe the sources of plant-specific and industry operating experience that are monitored on an ongoing basis to identify potential aging issues. Indicate whether these plant-specific sources require monitoring: corrective action program, system health reports, licensee event reports (LERs), and the results of inspections performed under the AMPs. Similarly, indicate whether these industry sources require monitoring: vendor recommendations, revisions to industry standards on which the AMPs are based, LERs from other plants, NRC Bulletins, Generic Letters, Regulatory Issue Summaries, Information Notices, Regulatory Guides, License Renewal Interim Staff Guidance, and revisions to NUREG-1801, "Generic Aging Lessons Learned (GALL) Report." Describe the criteria used to classify a particular piece of information as aging related and outline the training provided to plant personnel so that they can adequately make such classifications.
- b) Describe how the identified aging issues are further evaluated to determine their potential impact on the plant aging management activities. Indicate whether the affected structures and components and their materials, environments, aging effects, aging mechanisms, and AMPs are identified and documented consistent with the methods used to prepare the LRA. Describe how the results of AMP inspections are considered to adjust the frequency of future inspections, establish new inspections, and ensure an adequate depth and breadth of component, material, environment, and aging effect combinations. Describe the records of these evaluations and indicate whether they are maintained in an auditable and retrievable form.

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- c) Describe the process and criteria used to ensure that the identified enhancements are implemented in a timely manner.
- d) Describe the administrative controls over these programmatic activities.

Provide a summary description of these activities for the FSAR supplement required by 10 CFR 54.21(d). If enhancements for license renewal are necessary, also provide the updates for the FSAR supplement.

If such an operating experience program is determined to be unnecessary, provide a detailed explanation of the bases for this determination.

### **Energy Northwest Response:**

Two current programs are used at Columbia to continually monitor and evaluate plant specific and industry Operating Experience (OE) that includes OE regarding aging issues. These programs are the Corrective Action Program (CAP) and the Operating Experience Program (OEP). The evaluations completed under these two programs ensure that Aging Management Programs (AMP) are and will continue to be effective in managing the aging effects for which they are credited or whether the AMP needs to be enhanced, or new AMPs developed. Revisions to the procedures governing the CAP and OEP are approved by the owner organization, in addition to any other reviews designated by the owner organization, and are reviewed for technical accuracy by a minimum of two technical reviewers who are knowledgeable in the affected subject matter (functional areas).

#### **Plant Specific OE:**

The CAP ensures the following: A broad range of issues or conditions can be documented and coded to enable trending for the purpose of addressing broader programmatic or process weaknesses. In accordance with plant procedures, Conditions Adverse to Quality (CAQs) and Significant Conditions Adverse to Quality (SCAQs) are identified, reported to the appropriate level of management, and subsequently corrected. The cause of the condition is determined and corrective actions are taken to preclude recurrence. The CAP implements the requirements of 10 CFR 50, Appendix B, Criterion XVI. As such, the CAP is used to monitor plant specific OE (and industry OE that is relevant to Columbia, via the OEP, which meets the criteria for an "adverse condition"). The CAP is entered when degraded equipment or equipment not performing as expected or per design is identified. The definition of degraded includes the effects of aging.

#### **Input sources to the CAP include:**

- Adverse trends identified in the system health reports.
- Equipment failures that result in plant specific LERs.

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- Adverse results of inspections performed under an AMP.

The CAP identifies required due dates commensurate with the safety significance of the condition provided reasonable efforts are made to complete the corrective actions promptly or at the first available opportunity unless appropriate justification is provided for a longer completion schedule.

Completed CAP evaluations are forwarded to the permanent plant files to be maintained in accordance with appropriate records procedures.

Industry OE:

The OEP implements Nuclear Regulatory Commission (NRC) NUREG 0737, "Clarification of TMI Action Plan Requirements," Section I.C.5, and is consistent with guidance contained in Institute of Nuclear Power Operations (INPO) 10-006, Revision 1, "Operating Experience (OE) Program and Construction Experience (CE) Program Descriptions" and INPO 97-011, "Guidelines for the Use of Operating Experience." As such, the OEP monitors industry OE. Specifically the OEP requires that if the evaluation of an industry OE identifies any structures, systems or components at Columbia Generating Station that may be inoperable, a condition adverse to quality, or non-conformance, then the condition is entered into the CAP to ensure operability is documented and the condition is promptly reviewed and corrected.

Industry OE documents screened in the OEP for applicability to Columbia include, but are not limited to NRC Bulletins, Information Notices, Generic Letters and Regulatory Issues Summaries, 10 CFR 21 Reports, INPO Event Reports, and vendor information.

All License Event Reports (LER) from other plants are not evaluated under the OEP. Per INPO 10-006, INPO screens all LERs as an input source for issuance as an INPO Event Report. All INPO Event Reports are reviewed under the OEP.

Regulatory Guides, License Renewal Interim Staff Guidance, and revisions to industry standards on which the AMPs are based are not covered under the OEP because these are not OE. These documents may at best be lagging indicators based on other OE documents covered above.

Industry OE sources are monitored and OE is entered into the OEP and is categorized as: warrants further evaluation to identify barriers or preventive actions, informational, or not applicable. For OE reviews requiring evaluation; If the evaluation identifies any structures, systems or components at Columbia that may be inoperable, a condition adverse to quality, or non-conformance, the CAP is used to determine the action required. Completed OEP evaluations are forwarded to the permanent plant files to be maintained in accordance with appropriate records procedures.

Department Managers/Supervisors are responsible for ensuring OE evaluations are completed in a timely manner.

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### **Equipment Reliability Process:**

The equipment reliability process (which is based on industry guidance) represents the integration and coordination of a broad range of equipment reliability activities into one process for plant personnel to evaluate important station equipment, develop and implement a long-term maintenance plan, monitor equipment performance, and make continuing adjustments to tasks and frequencies based on equipment operating experience. This process includes systems, structures, and components within the scope of License Renewal and address the use of plant specific and industry OE. The equipment reliability process performs system component failure and problem trending using maintenance history, CAP data, and OEP data to adjust tasks or frequencies. The equipment reliability process also considers what other components are susceptible to the failure mechanism.

### **Training:**

AMP owners for existing and new AMPs were selected based on educational background and job experience or duties. In addition, those that are in the Engineering Support Personnel (ESP) population have received classroom training on component aging. The current AMP owners that are not within the ESP population are qualified due to their job position such as being qualified riggers, in the NDE group, or Chemistry group.

The CAP and OEP procedures provide guidance that the OE evaluation is to be assigned to personnel that possess technical knowledge in the subject area.

### **Appendix A Update:**

Energy Northwest does not intend to amend LRA Appendix A Sections A.1.2, A.1.3, or A.1.4 to describe CAP and OEP activities. As stated in FSAR Section 17.2 "The CGS program for quality assurance during the operations phase is provided separately in the Energy Northwest Operational Quality Assurance Program Description." The Operational Quality Assurance Program Description discusses both the CAP and OEP.

Under Corrective Actions, the Operational Quality Assurance Program Description states:

This section sets forth the requirements for identification, correction, documentation, and reporting of conditions adverse to quality such as failures, malfunctions, deficiencies, deviations, defective material and equipment, and nonconformances. Conditions adverse to quality shall be evaluated and the need for corrective actions determined in accordance with established procedures. These procedures shall provide for prompt identification and correction of conditions. For conditions significantly adverse to quality, the corrective action procedures shall provide for the following:

- a. Determination of the cause of the condition.

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- b. Corrective action so as to preclude repetition of the condition.
- c. Verification of the implementation of the corrective action.

Conditions significantly adverse to quality, its cause, and the corrective action taken shall be documented and reported to appropriate levels of management for review and assessment.

Under Operating Experience, the Operational Quality Assurance Program Description states:

An Operating Experience (OE) Program is established and the program procedure describes how industry-operating experience is identified, reviewed, evaluated, and documented. The industry operating experience information includes, but is not limited to, NRC Bulletins and Notices, INPO Significant Operating Experience Reports, Significant Event Reports, Significant Event Notifications and vendor information, such as GE Service Information Letters. The Operating Experience program administrator will perform the initial document review. The information that is applicable to the plant or ISFSI will be identified, evaluated and documented in accordance with the approved procedure. The operating experience information will be evaluated by the applicable knowledgeable organization. To prevent conflicting or contradictory information being conveyed to plant personnel, industry information processed via the Operating Experience Program is evaluated prior to use in the training program. Internal Operating Experience information identified via the Corrective Action Program will be evaluated for transmittal to the industry. Independent periodic evaluations of the Operating Experience review process will be performed by the Quality Organization.

Therefore, no additional description of these programs is required in the FSAR. However, Energy Northwest recognizes that the description in LRA Appendix B.1.4 may be construed as only addressing how OE was used to develop the LRA. Energy Northwest will amend this LRA section to clarify that OE review will be continued through the period of extended operation.

Conclusion:

Energy Northwest has an ongoing operating experience review process under the current licensing basis that ensures new relevant operating experience is reviewed and is factored into the aging management programs. This process will be maintained through the period of extended operation.

Energy Northwest recognizes the value in having a robust internal and external operating review process specific to License Renewal. Therefore, Energy Northwest will enhance the ongoing internal and external operating experience review process by strengthening the review and documentation process relative to license renewal aging issues. The enhancement will provide additional confidence that aging related internal and external operating experience for in-scope structures and components, their



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materials, environments, aging effects, aging mechanisms, and AMPs are identified and documented consistent with the methods used to prepare the LRA.

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Enclosure 1

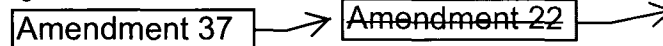
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**AMENDMENT 37**

Section Number	Page Number	RAI Number
Table A-1 Line Item 50	A-63a	Revised for Consistency
Table A-1 Line Item 64	A-68b	Revised for Consistency
Table A-1 Line Item 72	A-68e	B.1.4-1
B.1.4	B-9	B.1.4-1
B.1.4	B-10	B.1.4-1
B.1.4	B-10a	B.1.4-1
Table B-1 Line Items XI.S8 and XI.E3	B-16	Revised for consistency

**Table A-1  
Columbia License Renewal Commitments**

Item Number	Commitment	FSAR Supplement Location (LRA App. A)	Enhancement or Implementation Schedule
50) Structures Monitoring Program (cont'd)  Insert A to Page A-63	<ul style="list-style-type: none"> <li>• Specify additional direction for quantifying, monitoring and trending of inspection results.</li> <li>• Provide better alignment with referenced Industry codes, standards and guidelines regarding terminology and evaluation.</li> <li>• Revise to add sufficient acceptance criteria and critical parameters to trigger level of inspection and initiation of corrective action. ACI 349.3R-96 provides an acceptable basis for developing acceptance criteria for concrete structural elements, steel liners, joints, coatings, and waterproofing membranes. Plant specific quantitative degradation limits, similar to the three-tier hierarchy acceptance criteria from Chapter 5 of ACI 349.3R-96, will be developed and added to the inspection procedure.</li> </ul>		
50) Structures Monitoring Program (cont'd) Insert B to Page A-63	Conduct a base line inspection of the structures within the scope of license renewal plus a minimum of one additional inspection prior to entering the period of extended operation.		<del>Baseline inspection plus a minimum of one additional inspection prior to the period of extended operation.</del>

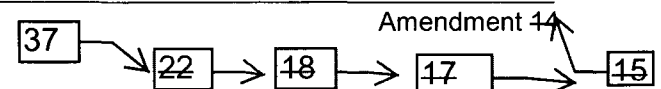


Insert A into page A-68a

Item Number	Commitment	FSAR Supplement Location (LRA App. A)	Enhancement or Implementation Schedule
62) Service Level 1 Protective Coatings Program	The Service Level 1 Protective Coatings Program is an existing program that will be continued for the period of extended operation.	A.1.2.55	Ongoing
63) Inservice Inspection (ISI) Program	Ultrasonic Testing (UT) examination of creviced shroud support plate access hole cover weld, top hat configuration, will be performed once a demonstrated acceptable UT technique becomes available.	A.1.2.33	When demonstrated acceptable UT technique is available.  Then ongoing.
64) Inservice Inspection (ISI) Program - IWE	Verify leakage is not entering the annular space between the containment vessel and the concrete shield wall from the outer refueling bellows seal. Inspection of the portions of the outer containment vessel shell made accessible by opening all eight inspection ports in the containment vessel at 570 foot elevation will be performed to check for evidence of leakage. These inspections will be performed during a refueling outage while the reactor cavity is flooded.	<p style="text-align: center;">N/A ↑ A.1.2.34</p>	During the fourth Inservice Inspection (ISI) interval prior to the period of extended operation (PEO) and again in the fifth ISI interval after entering the PEO.

Insert new row 65 from Page A-68c for Amendment 18

Insert new rows 66 and 67 from Page A-68c for Amendment 22



Insert A for page A-68d:

Item Number	Commitment	FSAR Supplement Location (LRA App. A)	Enhancement or Implementation Schedule
71) BWR Vessel Internals Program	<p>Columbia will perform either of the following two years prior to the period of extended operation:</p> <ol style="list-style-type: none"> <li>1) Install wedges to prevent lateral motion of the core plate in the event of stress relaxation of the core plate rim hold-down bolts at least two years prior to the beginning of the period of extended operation, or</li> <li>2) Submit a plant-specific TLAA addressing the stress relaxation of the core plate rim hold-down bolts to the NRC for review and approval at least two years prior to the beginning of the period of extended operation. This TLAA shall analyze stress relaxation of the core plate rim hold-down bolts due to exposure of the pre-loaded bolts to neutron radiation over the life of the plant, and the analysis methods shall be consistent with the generic BWR core plate analysis specified in Appendix B of BWRVIP-25.</li> </ol>	A.1.2.10	2 years prior to period of extended operation.
72) Operating Experience Review	Energy Northwest will enhance the ongoing internal and external operating experience review process by strengthening the review and documentation process relative to license renewal aging issues.	B.1.4	Within ten years prior to entering the period of extended operation

## Confirmation Process:

The focus of the confirmation process is on the follow-up actions taken to verify effective implementation of corrective actions and preclude repetition of significant conditions adverse to quality. The corrective action program includes the requirement that measures be taken to preclude repetition of significant conditions adverse to quality. These measures include actions to verify effective implementation of proposed corrective actions. The confirmation process is part of the corrective action program and, for significant conditions adverse to quality, includes:

- reviews to assure proposed actions are adequate,
- tracking and reporting of open corrective actions,
- Root Cause and Apparent-Common Cause evaluations, and
- reviews of corrective action effectiveness.

Effectiveness reviews are conducted as part of the corrective action process to ensure that all corrective actions have been completed and to identify any repetition of the event. The corrective action process is also monitored for potentially adverse trends. The existence of an adverse trend due to recurring or repetitive adverse conditions will result in the initiation of a follow-up condition report.

## Administrative Controls:

Administrative controls that govern aging management activities are established within the document control procedures that implement: (1) industry standards related to administrative controls and quality assurance for the operational phase of nuclear power plants, and (2) the requirements of 10 CFR 50, Appendix B, Criterion VI.

Plant policies, directives, and procedures are written and controlled to specify and manage various activities, particularly those related to compliance with 10 CFR 50, Appendix B. The phrase "administrative control" refers to the adherence to the policies, directives, and procedures, and includes the formal review and approval process that the plant policies, directives, and procedures undergo as they are issued (and subsequently revised). The individual documents (i.e., the plant policies, directives, and procedures), in conjunction with the plant's quality assurance program documents, provide the overall administrative framework to ensure regulatory requirements are met.

### B.1.4 Operating Experience

← As it relates to preparation of the LRA

Operating experience for existing Columbia plant programs and activities was reviewed as an input to the aging management program evaluations. The operating experience review demonstrates the effectiveness of the plant programs and activities that are credited with aging management for the period of extended operation.

Plant procedures require that the discovery of conditions adverse to quality be documented in accordance with the corrective action program. A review of plant records for the most recent seven-year period (January 2001 through July 2008) was performed in order to identify age-related issues of degradation related to current plant operation. The scope of the review included reports generated under the corrective action program and licensee event reports. These records provide documentation of situations where systems, structures, and components exhibit conditions adverse to quality, including age-related degradation. Keywords related to aging and degradation were used to search the records.

The operating experience review provides the basis for the determination that existing programs are either effective or require enhancement; that one-time inspections are appropriate to verify that either aging is not occurring or that aging is being effectively managed by an existing program; or that a new program is required to be established to manage the effects of aging.

The operating experience review included consideration of the results of programmatic assessments performed by Columbia and of those performed by outside agencies, including the NRC. Past corrective actions resulting in program enhancements are included in the evaluation of program effectiveness. Industry operating experience was considered specifically for new programs with no plant-specific operating experience or when industry events were significant for existing programs. The operating experience review provides objective evidence that the effects of aging will be managed for the period of extended operation.

### **B.1.5 Aging Management Programs**

Insert A  
from page  
B-10a

Table B-1 provides a listing of the NUREG-1801 aging management programs and the corresponding aging management programs for Columbia. Table B-2 provides a summary of the aging management programs for Columbia with respect to consistency with NUREG-1801 aging management programs. Table B-2 also provides information on whether programs are existing or new, whether enhancements are required, and whether the programs are plant-specific. Each aging management program credited for license renewal is addressed in Section B.2.

Insert A:

**As it relates to the ongoing process**

Operating experience for Columbia plant programs and activities is reviewed as an input to the aging management program evaluations. The operating experience review demonstrates the effectiveness of the plant programs and activities that are credited with aging management for the period of extended operation.

Plant procedures require that the discovery of conditions adverse to quality be documented in accordance with the corrective action program. The scope of the review includes reports generated under the corrective action program and licensee event reports. These records provide documentation of situations where systems, structures, and components exhibit conditions adverse to quality, including age-related degradation.

The operating experience review provides the basis for the determination that programs are either effective or require enhancement; that one-time inspections are appropriate to verify that either aging is not occurring or that aging is being effectively managed by an existing program; or that a new program is required to be established to manage the effects of aging.

The operating experience review includes consideration of the results of programmatic assessments performed by Columbia and of those performed by outside agencies, including the NRC. Industry operating experience is considered specifically for new programs with no plant-specific operating experience or when industry events are, significant for existing programs. The operating experience review provides objective evidence that the effects of aging will be managed for the period of extended operation.



**Table B-1**  
**Correlation of NUREG-1801 and Columbia Aging Management Programs**  
 (continued)

Number	NUREG-1801 Program	Corresponding Columbia AMP
XI.S8	Protective Coating Monitoring and Maintenance Program	Not credited for aging management. Columbia does not credit coatings inside the containment to manage the effects of aging for structures and components or to ensure that the intended functions of coated structures and components are maintained. Therefore, these coatings do not have an intended function and do not require aging management for license renewal.
XI.E1	Electrical Cables and Connections Not Subject to 10 CFR 50.49 Environmental Qualification Requirements	Electrical Cables and Connections Not Subject to 10 CFR 50.49 EQ Requirements Program See Section B.2.19.
XI.E2	Electrical Cables Not Subject to 10 CFR 50.49 Environmental Qualification Requirements Used in Instrumentation Circuits	Electrical Cables and Connections Not Subject to 10 CFR 50.49 EQ Requirements Used in Instrumentation Circuits Program See Section B.2.20. <span style="border: 1px solid black; padding: 2px;">Power</span>
XI.E3	Inaccessible Medium-Voltage Cables Not Subject to 10 CFR 50.49 Environmental Qualification Requirements	Inaccessible <del>Medium-Voltage</del> Cables Not Subject to 10 CFR 50.49 EQ Requirements Program See Section B.2.32.
XI.E4	Metal-Enclosed Bus	Metal-Enclosed Bus Program See Section B.2.40.

Replace Row with Insert A from page B-16a

Amendment 37

Amendment 16

Amendment 14